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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/587,813	06/06/00	LOTT M	AP32618(0658

EXAMINER

LEE, S

ART UNIT	PAPER NUMBER
1752	5

DATE MAILED: 10/03/01

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IM22/1003

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No. 09/587,813	Applicant(s) LOTT ET AL.	
	Examin r Sin J Lee	Art Unit 1752	

-- The MAILING DATE of this communication app ars on the cover sheet with th correspond nce address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 June 2000* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,8 and 11-21* is/are rejected.

7)☒ Claim(s) *7,9 and 10* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

1. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: There is no antecedent basis for the subject matter claimed in claim 7.

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-6, 8, 12, 16-18, 20, and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Nakao et al (5,667,942).

Nakao teaches a resist pattern forming method (for forming a resist pattern in a lithographic step in a semiconductor device fabrication process) which includes: (I) an application step of applying a photoresist onto a semiconductor substrate; (ii) a prebake step (before the imagewise exposure) of prebaking the photoresist *in an atmosphere containing water vapor* following the application of the photoresist to the substrate; (iii) an exposure step of exposing the photoresist to radiation following the prebake step; (iv) a heating step of heating the photoresist following the exposure step; and (v) a development step of developing the photoresist following the heating step. See abstract. Nakao's method is intended to control the water content in a resist film for improvement of sensitivity of the resist (see col.2, lines 23-28). That is, the prebake step is conducted in an atmosphere containing water vapor, so that a large amount of water is imparted to and therefore becomes present in the resist film for high solution speed of an exposed part into developer, with a result of high resist sensitivity (see col.3, lines 23-28).

Therefore, the prior art teaches the present invention of claims 1, 12, 18, 20, and 21.

Nakao teaches a positive type resist made of novolak resin, and naphthoquinonediazido photosensitizer, and thus the prior art teaches the present inventions of claims 2, 3, 4, and 5 (as explained in present specification, pg.14, lines 24-25 - pg.15, lines 1-20, novolak resin is a phenolic resin).

With respect to present claim 8, Nakao teaches (col.2, lines 51-53) that the heating treatment of the prebake step is carried out at 90-110°C. Since 90°C is defined as the end point of the range, one of ordinary skill in the art would have immediately envisaged carrying out

Nakao's heating treatment of the prebake step at 90°C. Therefore, the prior art teaches the present range of 40-90°C of claim 8. As stated in In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976), "the disclosure in the prior art of any value within a claimed range is an anticipation of that range."

With respect to present claim 6, it is known in the art that typical novolak resins have glass transition temperatures between 90-120°C as evidenced by Dammel et al, col.1, lines 48-50. Therefore, when one carries out Nakao's prebake heating treatment at 90°C as taught by Nakao, it would inherently be the case that the glass transition temperature of the novolak resin (90-120°C) is not exceeded in the heat treatment as presently claimed in claim 6. Therefore, Nakao teaches the present invention of claim 6.

With respect to present claim 16, Nakao's resist composition comprising naphthoquinonediazido photosensitizer is insoluble in alkaline developer before the exposure. However, when UV radiation is applied, the naphthoquinonediazido is photochemically changed into indeneketene which quickly reacts with water to form carboxylic acid which is soluble in alkaline developers (see col.1, lines 65-67, col.2, lines 1-6). Therefore, Nakao's naphthoquinonediazido photosensitizer is acting as a dissolution inhibitor, and thus the prior art teaches the present insolubilizer means which act to inhibit the dissolution of the coating in a developer *prior to imaging*.

With respect to present claim 17, since Nakao teaches the present steps (a) and (b) of claim 17, it is the Examiner's position that Nakao's method would inherently be capable of forming a printing form precursor as presently recited.

5. Claims 1, 2, 11, 12, 14, 16-18, 20, and 21 are rejected under 35 U.S.C. 102(e) as being anticipated by Yoshioka (6,002,108).

Yoshioka teaches (col.1, lines 5-7) a baking apparatus and a baking method for baking a resist film coated on a substrate such as a semiconductor wafer. After the surface of the wafer is *coated with a photoresist*, it is then *exposed* to light together with a predetermined pattern, and *developed* (col.1, lines 11-14). Yoshioka states (col.1, lines 20-23) that the series of resist processing steps include various baking processes performed for different purposes, and that *prebake is made to stabilize the resist*. Yoshioka teaches (col.1, lines 54-67, col.2, lines 1-8) that his baking apparatus comprises a *casing* surrounding a substrate, a hot plate for *heating* the substrate *in the casing*, a gas supply mechanism for supplying a H_2O *component* containing *humidity gas* into the casing, and preferably further comprises a cover provided closely to the substrate *in the casing* for forming a *process space* for baking the resist film between the cover and the substrate. If such a *small process space* is formed between the cover and the substrate, H_2O component contained in the humidity gas can be efficiently reacted with the resist film, with the result that a quality of the resist film is improved, increasing the throughput of the baking process. Yoshioka clearly teaches (col.6, lines 56-57) that his baking apparatus is used for baking process such as *prebake for stabilizing the resist before light exposure*, as well as post

exposure bake after the light exposure. Therefore, the prior art teaches the present inventions of claims 1, 11, 12, 18, 20, and 21.

As the photoresist in his invention, Yoshioka teaches (col.3, lines 4-65, col.4, col.5, lines 1-40) a *chemically amplified resist* comprising an acetal-protected polyhydroxystyrene, which is *alkali-insoluble before the exposure* but becomes alkali-soluble upon exposure in the presence of *a photoacid generator* (i.e., upon exposure the acetal group leaves polyhydroxystyrene, and polyhydroxystyrene is soluble in alkali). Therefore, Yoshioka teaches the present inventions of claims 2 and 16; since Yoshioka's acetal-protected polyhydroxystyrene is acting as a dissolution inhibitor, the prior art teaches the present insolubilizer means of claim 16 which acts to inhibit the dissolution of the coating in a developer *prior to imaging*.

With respect to present claim 17, since Yoshioka teaches the present steps (a) and (b) of claim 17, it is the Examiner's position that the prior art's method would inherently be capable of forming a printing form precursor as presently recited.

6. Claims 3-6 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshioka (6,002,108) (with Dammel et al (5,510,420) cited to show that typical novolak resins have glass transition temperature between 90-120°C).

Yoshioka teaches (col.12, lines 23-27) equivalence of the chemically amplified resist comprising an acetal-protected polyhydroxystyrene and a resist comprising a novolak resin. Since the prior art teaches the equivalence of these two, it would have been obvious to one of ordinary skill in the art to replace the chemically amplified resist comprising an acetal-protected

polyhydroxystyrene with a resist comprising a novolak resin with a reasonable expectation of achieving an ultra fine pattern uniform in line width on the resist film. Since novolak resin is a phenolic resin (see present specification, pg.14, lines 24-25 - pg.15, lines 1-20), Yoshioka's teaching would render obvious the present inventions of claims 3-5.

With respect to present claim 8, Yoshioka teaches (col.11, lines 49-50) a suitable temperature for the baking step to be for example, 90°C, and thus the prior art teaches the present range (40-90°C) of claim 8. As stated in In re Wertheim, supra, "the disclosure in the prior art of any value within a claimed range is an anticipation of that range."

With respect to present claim 6, it is known in the art that typical novolak resins have glass transition temperatures between 90-120°C as evidenced by Dammel et al, col.1, lines 48-50. Therefore, when one carries out Yoshioka's prebaking at 90°C, it would inherently be the case that the glass transition temperature of the novolak resin (90-120°C) is not exceeded in the heat treatment as presently claimed in claim 6. Therefore, Yoshioka teaches the present invention of claim 6.

7. Claims 1-6, 8, 12-19, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takata et al (6,143,471) in view of Nakao et al (5,667,942) (with Dammel et al (5,510,420) cited to show that typical novolak resins have glass transition temperature between 90-120°C).

Takata teaches (col.2, lines 52-65) a *positive* type photosensitive composition capable of making a lithographic printing plate comprising a polymer which is soluble in an alkaline developer, a near infrared rays-absorbing dye, and a compound which lowers solubility of the

polymer in the alkaline developer (*present insolubilizer of claim 16*). Takata dissolves his positive photosensitive composition in a solvent and coats it on a support (col.32, lines 62-67). After the coating and *drying*, a lithographic printing plate is prepared by imagewise exposing the positive photosensitive composition (by irradiating with a semiconductor laser which irradiates near infrared rays at a wavelength of 700-900 nm) and then developing the exposed plate material using an alkaline developer (see col.33, line 15, lines 56-60, col.34, lines 31-32). Takata teaches (see Example 1) that the drying step (after the coating of the photosensitive composition) is done at 40°C for 20 minutes. However, Takata does not does not teach the presently claimed heat treatment step in which removal of moisture from the precursor is inhibited during the heat treatment. Nakao teaches (col.2, lines 23-37) that carrying out a prebake step (after applying a photoresist onto a substrate) in an atmosphere containing water vapor improves sensitivity of the photoresist. Based on Nakao's teaching, it would have been obvious to one of ordinary skill in the art to carry out Takata's drying step (at 40°C for 20 minutes) in an atmosphere containing water vapor in order to improve sensitivity of the photoresist as taught by Nakao. Therefore, Takata in view of Nakao would render obvious the present inventions of claims 1, 2, 12, 16, 17, 19, and 21.

With respect to present claims 3-5, as the polymer soluble in an alkaline developer, Takata teaches that a novolak resin is particularly preferred (col.30, lines 41-42). Since a novolak resin is a phenolic resin, the prior art teaches the present inventions of claims 3-5.

With respect to present claim 6, since Takata teaches that their drying step is done at 40°C, and since typical novolak resins have glass transition temperature between 90-120°C as evidenced by Dammel et al, col.1, lines 48-50, Takata in view of Nakao teaches the present inventions of claim 6.

With respect to present claim 8, since Takata teaches that their drying step is done at 40°C, the prior art teaches the present range of claim 8 (40-90°C). As stated in In re Wertheim, supra, "the disclosure in the prior art of any value within a claimed range is an anticipation of that range."

With respect to present claim 13, Takata's plate material is imagewisely exposed (in order to increase the solubility in the exposed area) by a semiconductor laser which irradiates *near infrared rays* at a *wavelength of 700-900 nm* (see col.33, lines 56-60). Therefore, the prior art teaches the present limitation "the coating is such that its solubility in a developer is not increased by incident UV radiation".

With respect to present claim 14, since Takata's plate material is imagewise exposed by near infrared radiation (an electromagnetic radiation), and the plate material contains the near infrared rays-absorbing dye (which is used to convert the absorbed radiation into heat), the prior art teaches the present invention of claim 14.

With respect to present claim 15, since Takata uses the near infrared ray-absorbing dye (which absorbs at the wavelength of 700-1200 nm - see col.31, lines 23-27), the prior art's

teaching would have made the present range (600-1400 nm) *prima facie* obvious. See In re Wertheim, supra.

With respect to present claim 18, since Takata in view of Nakao teach the present steps (a) and (b) of claim 18, it is the Examiner's position that the method taught by Takata in view of Nakao would inherently be capable of forming an electronic part precursor as present claimed in claim 18.

8. Claims 1-6, 8, 11-19, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takata et al (6,143,471) in view of Yoshioka (6,002,108) (with Dammel et al (5,510,420) cited to show that typical novolak resins have glass transition temperature between 90-120°C).

Takata teaches (col.2, lines 52-65) a *positive* type photosensitive composition capable of making a lithographic printing plate comprising a polymer which is soluble in an alkaline developer, a near infrared rays-absorbing dye, and a compound which lowers solubility of the polymer in the alkaline developer (*present insolubilizer of claim 16*). Takata dissolves his positive photosensitive composition in a solvent and coats it on a support (col.32, lines 62-67). After the coating and *drying*, a lithographic printing plate is prepared by imagewise exposing the positive photosensitive composition (by irradiating with a semiconductor laser which irradiates near infrared rays at a wavelength of 700-900 nm) and then developing the exposed plate material using an alkaline developer (see col.33, line 15, lines 56-60, col.34, lines 31-32). Takata teaches (see Example 1) that the drying step (after the coating of the photosensitive composition) is done at 40°C for 20 minutes. However, Takata does not does not teach the presently claimed

heat treatment step in which removal of moisture from the precursor is inhibited during the heat treatment. Yoshioka teaches (col.1, lines 22-23, lines 53-67, col.2, lines 1-8, col.6, lines 56-57) a prebaking step using a baking apparatus which has a *casing surrounding* a substrate and a gas supply mechanism for supplying a H_2O *component* containing *humidity gas* in order to stabilize the resist. Based on Yoshioka's teaching, it would have been obvious to one of ordinary skill in the art to carry out Takata's drying step (at 40°C for 20 minutes) using Yoshioka's baking apparatus in order to stabilize the resist. Therefore, Takata in view of Yoshioka would render obvious the present inventions of claims 1, 2, 11, 12, 16, 17, 19, and 21.

With respect to present claims 3-5, as the polymer soluble in an alkaline developer, Takata teaches that a novolak resin is particularly preferred (col.30, lines 41-42). Since a novolak resin is a phenolic resin, the prior art teaches the present inventions of claims 3-5.

With respect to present claim 6, since Takata teaches that their drying step is done at 40°C, and since typical novolak resins have glass transition temperature between 90-120°C as evidenced by Dammel et al, col.1, lines 48-50, Takata in view of Yoshioka teach the present invention of claim 6.

With respect to present claim 8, since Takata teaches that their drying step is done at 40°C, the prior art teaches the present range of claim 8 (40-90°C). As stated in In re Wertheim, supra, "the disclosure in the prior art of any value within a claimed range is an anticipation of that range."

With respect to present claim 13, Takata's plate material is imagewisely exposed (in order to increase the solubility in the exposed area) by a semiconductor laser which irradiates *near infrared rays* at a *wavelength of 700-900 nm* (see col.33, lines 56-60). Therefore, the prior art teaches the present limitation "the coating is such that its solubility in a developer is not increased by incident UV radiation".

With respect to present claim 14, since Takata's plate material is imagewise exposed by near infrared radiation (an electromagnetic radiation), and the plate material contains the near infrared rays-absorbing dye (which is used to convert the absorbed radiation into heat), the prior art teaches the present invention of claim 14.

With respect to present claim 15, since Takata uses the near infrared ray-absorbing dye (which absorbs at the wavelength of 700-1200 nm - see col.31, lines 23-27), the prior art's teaching would have made the present range (600-1400 nm) *prima facie* obvious. See In re Wertheim, supra.

With respect to present claim 18, since Takata in view of Yoshioka teach the present steps (a) and (b) of claim 18, it is the Examiner's position that the method taught by Takata in view of Nakao would inherently be capable of forming an electronic part precursor as present claimed in claim 18.

9. Claims 7, 9, and 10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

None of the cited prior arts teaches nor fairly suggests the present duration limitation of claim 7 ("at least 12 hours") for the heat treatment. Also, none of the cited prior arts teaches nor fairly suggests the present method being applied to a precursor coil or to a stack of at least 100 precursors as claimed in claims 9 and 10 respectively.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sin J. Lee whose telephone number is (703) 305-0504. The examiner can normally be reached on Monday-Friday from 8:30 am EST to 5:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ms. Janet Baxter, can be reached on (703) 308-2303. The fax phone number for the organization where this application or proceeding is assigned is (703) 305-3599 for after final responses or (703) 305-7718 for all other responses.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-0661.

S. Lee
September 29, 2001

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